Claims

1. An apparatus, comprising:

a very high frequency (VHF) antenna; and

a frequency selective surface (FSS) structure adjacent to the VHF antenna, wherein the FSS structure includes:

a ground plane;

a first conductive via coupled to the ground plane; and

a first conductive plate coupled to the first conductive via, wherein the FSS structure has a band gap frequency in the VHF band.

2. The apparatus of claim 1, wherein the band gap frequency of the FSS structure ranges from about 108 MHz to about 118 MHz.

3. The apparatus of claim 1, wherein the band gap frequency of the FSS structure ranges from about 118 MHz to about 137 MHz.

4. The apparatus of claim 1, wherein the band gap frequency of the FSS structure is centered at about 113 MHz.

5. The apparatus of claim 1, wherein the band gap frequency of the FSS structure is centered at about 127 MHz.

6. The apparatus of claim 1, wherein the FSS structure further includes a dielectric material between the first conductive plate and the ground plane.

7. The apparatus of claim 7, wherein the dielectric material includes ionizing particles.

8. The apparatus of claim 1, wherein the FSS structure has a thickness ranging from about 0.5 centimeters (cm) to about 1.3 cm.

9. The apparatus of claim 1, wherein a first end of the first conductive via is coupled to the first conductive plate and a second end of the first conductive via is coupled to the ground plane and wherein the first conductive via has a length ranging from about 0.5 centimeters (cm) to about 1.3 cm and a diameter of about 0.16 cm.

10. The apparatus of claim 1, wherein the ground plane has a thickness of a about 0.005 centimeters (cm), the first conductive plate is substantially square-shaped, and the first conductive plate has a thickness of about 0.005 cm, a length of about 3.8 cm, and a width of about 3.8 cm.

11. The apparatus of claim 1, wherein the first conductive plate is substantially square-shaped, rectangular, triangular, hexagonal, or circular .

12. The apparatus of claim 1, wherein the FSS structure further comprises:

a dielectric material between the first conductive plate and the ground plane, wherein the first conductive plate is formed overlying a first surface of the dielectric material and the ground plane is formed overlying a second surface of the dielectric material; and

a first printed inductor overlying the first surface of the dielectric material and coupled to the first conductive plate and the first conductive via, wherein the first printed inductor and the first conductive via are formed substantially at the geometric center of first conductive plate.

13. The apparatus of claim 12, wherein the first printed inductor is a substantially rectangular-shaped conductor having a length of about 1 to about 1.5 centimeters, a width of about 0.1 to 0.3 centimeters, and a thickness of about 0.005 to about 0.0125 centimeters.

14. The apparatus of claim 12, wherein the first printed inductor and the first conductive plate are formed by patterning a single layer of conductive material.

15. The apparatus of claim 12, wherein the first printed inductor is a coil having at least one turn.

16. The apparatus of claim 12, wherein the FSS structure further includes:

a second conductive plate overlying the first surface of the dielectric material and separated from the first conductive plate by about 0.05 cm;

a second conductive via having a first end formed substantially at the geometric center of second conductive plate and a second end coupled to the ground plane; and

a second printed inductor overlying the first surface of the dielectric material and coupled to the second conductive plate and to the first end of the second conductive via, wherein the second printed inductor is formed substantially at the geometric center of second conductive plate.

17. A apparatus, comprising:

a very high frequency (VHF) antenna; and

a frequency selective surface (FSS) structure adjacent to the VHF antenna and tuned to the operating frequency of the VHF antenna, wherein the FSS structure includes:

a conductive back plane;

a conductive column coupled to the conductive back plane; and

a conductive pad coupled to the conductive column, wherein the thickness of the FSS structure and the surface area of the conductive pad are sized to suppress radio frequency (RF) surface currents in the VHF band from propagating along the conductive back plane.

18. The apparatus of claim 17, wherein the FSS structure has a thickness ranging from about 0.5 centimeters (cm) to about 1.3 cm.

19. The apparatus of claim 17, wherein the FSS structure further includes a dielectric material between the conductive pad and the conductive back plane, wherein the dielectric material includes ionizing particles.

20. The apparatus of claim 17, wherein the FSS structure further comprises:

a dielectric material between the conductive pad and the conductive back plane, wherein the conductive pad is formed overlying a first surface of the dielectric material and the conductive back plane is formed overlying a second surface of the dielectric material; and

a printed inductor overlying the first surface of the dielectric material and coupled to the conductive pad and the conductive column, wherein the printed inductor and the conductive column are formed substantially at the geometric center of conductive pad.

21. A system, comprising:

an aircraft antenna coupled to receive radio frequency (RF) signals having a carrier frequency ranging from about 118 megahertz (MHz) to about 137 MHz; and

a frequency selective surface (FSS) structure adjacent to the aircraft antenna that includes:

a ground plane;

a conductive via coupled to the ground plane; and

a conductive plate coupled to the conductive via, wherein the FSS has a band gap frequency ranging from about 118 megahertz (MHz) to about 137 MHz.

22. The system of claim 21, further comprising a wireless receiver coupled to receive the RF signals from the aircraft antenna, and wherein the receiver is part of an aircraft very high frequency (VHF) communications system.

23. The apparatus of claim 21, wherein the FSS structure has a thickness ranging from about 0.5 centimeters (cm) to about 1.3 cm.

24. The apparatus of claim 21, wherein the FSS structure further includes a dielectric material between the conductive plate and the ground plane, wherein the dielectric material includes ionizing particles.

25. A system, comprising:

an aircraft antenna coupled to receive radio frequency (RF) signals having a carrier frequency ranging from about 108 megahertz (MHz) to about 118 MHz; and

a frequency selective surface (FSS) structure adjacent to the aircraft antenna that includes:

a ground plane;

a conductive via coupled to the ground plane; and

a conductive plate coupled to the conductive via, wherein the FSS has a band gap frequency ranging from about 108 megahertz (MHz) to about 118 MHz.

26. The system of claim 25, further comprising a wireless receiver coupled to receive the RF signals from the aircraft antenna, and wherein the receiver is part of an aircraft instrument landing system (ILS) or an aircraft Very High Frequency Omnirange (VOR) system.

27. The apparatus of claim 25, wherein the FSS structure has a thickness ranging from about 0.5 centimeters (cm) to about 1.3 cm.

28. The apparatus of claim 25, wherein the FSS structure further includes a dielectric material between the conductive plate and the ground plane, wherein the dielectric material includes ionizing particles.